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Effective on 12/8/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant Claims small entity status. See 37 CFR 1.27	
TOTAL AMOUNT OF PAYMENT	**$620.00**

Complete if Known	
Application Number	09/754,806
Filing Date	01/02/2001
First Named Inventor	Liu
Examiner Name	Nadav, Ori
Art Unit	2811
Attorney Docket No.	00CON122P-DIV1

METHOD OF PAYMENT (check all that apply)

☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify):_____

☒ Deposit Account Deposit Account Number: **50-0731** Deposit Account Name: **Farjami & Farjami LLP**

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES	Small Entity	SEARCH FEES	Small Entity	EXAMINATION FEES	Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	0	x $50.00	= $ 0.00

HP = highest number of total claims paid for, if greater than 20

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	0	x $200.00	= $ 0.00

HP = highest number of independent claims paid for, if greater than 3

Multiple Dependent Claims Fee ($)	Fee Paid ($)
$360.00	

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41 (a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	0	/ 50 = 0 (round up to a whole number)	x $250.00 =	$ 0.00

4. OTHER FEE(S) Fees Paid($)

Non-English Specification, $130 fee (no small entity discount) _____

Other: **Filing a brief in support of an appeal and one (1) month extension fee** **$620.00**

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 38135	Telephone (949) 282-1000
Name (Print/Type)	Michael Farjami, Esq.		Date 9/11/06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Liu, et al.**	Art Unit: 2811
Serial No.: 09/754,806	Examiner: Nadav, Ori
Filed: January 2, 2001	
For: **On-Chip Inductors**	

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This is an Appeal from the Examiner's Final Rejection of claims 24, 25, 30-44, and 46-48. The Final Rejection issued on April 24, 2006. The Notice of Appeal was filed in the U.S. Patent and Trademark Office on July 3, 2006.

REAL PARTY IN INTEREST

The real party in interest is Newport Fab, LLC dba Jazz Semiconductor.

RELATED APPEALS AND INTERFERENCES

There are no related Appeals or Interferences.

STATUS OF CLAIMS

Claims 24, 25, 30-44, and 46-48 are pending, and claims 1-23, 26-29, and 45 were canceled in previous amendments. Claims 24, 25, 30-44, and 46-48 have been finally rejected in a Final Rejection dated April 24, 2006. This Appeal is directed to the rejection of claims 24, 25, 30-44, and 46-48. Claims 24, 25, 30-44, and 46-48 appear in an Appendix to this Appeal Brief.

STATUS OF AMENDMENTS

No claim amendments have been entered after issuance of the Final Rejection of April 24, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

A. Claim 24

Independent claim 24 defines a structure (e.g., inductor 300 in Figures 3A and 3B) in a semiconductor chip. The structure (e.g., inductor 300 in Figures 3A and 3B) includes a first area (e.g., dielectric 303 in Figure 3B) of a low-k dielectric (e.g., dielectric 303 in Figure 3B) having a first permeability and a second area (e.g., dielectric areas 302 in Figure 3B) of the low-k dielectric (e.g., dielectric 303 in Figure 3B) having a second permeability, such that the second permeability is higher than the first permeability. *See*, e.g., page 14, lines 13-19 and Figure 3B of the present application. The first area (e.g., dielectric 303 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B) is not situated underneath the second area (e.g., dielectric areas 302 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B) and is not situated over the second area (e.g., dielectric areas 302 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B).

The structure (e.g., inductor 300 in Figure 3B) further includes a permeability conversion material interspersed within the second area (e.g., dielectric areas 302 in Figure 3B) of the low-k dielectric (e.g., dielectric 303 in Figure 3B) by ion implantation, where the permeability conversion material has a third permeability that is greater than the first and second permeabilities. *See*, e.g., page 15, lines 18-23, page 16, lines 1-2, and Figure 3B of the present application. The permeability conversion material is selected

from the group consisting of nickel, iron, nickel-iron alloy, and magnetic oxide. *See*, e.g., page 11, lines 15-19 of the present application.

The structure (e.g., inductor 300 in Figure 3B) further includes a conductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) patterned in the second area (e.g., dielectric areas 302 in Figure 3B) of the low-k dielectric (e.g., dielectric 303 in Figure 3B), such that the permeability conversion material is not situated underneath the conductor. *See*, e.g., page 14, line 23, page 15, lines 1 and 6, and Figure 3B of the present application. In the structure (e.g., inductor 300 in Figure 3B), the low-k dielectric (e.g., dielectric 303 in Figure 3B) is not situated underneath the conductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) and is not situated over the conductor. The conductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) is selected from the group consisting of copper, aluminum, and copper-aluminum alloy. *See*, e.g., page 9, lines 23-24 and Figure 3B of the present application. The first area of the dielectric (e.g., dielectric 303 in Figure 3B), the second area (e.g., dielectric areas 302 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B), and the conductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) have a same thickness (e.g., depth 222 in Figure 2B). *See*, e.g., page 14, lines 1-2, and Figure 2B of the present application.

B. Claim 31

Independent claim 31 defines a structure in a semiconductor chip. The structure includes a dielectric (e.g., dielectric 202 in Figure 2B) having a first permeability and a

permeability conversion material having a second permeability, where the second permeability is greater than the first permeability. *See*, e.g., page 12, lines 19-20, page 13, lines 8-9, and Figure 2B of the present application. The permeability conversion material comprises metal ions and is interspersed within the dielectric (e.g., dielectric 202 in Figure 2B). *See*, e.g., page 13, lines 8-13 and Figure 2B of the present application.

The structure further includes an inductor (e.g., inductor 200 in Figure 2B) comprising a conductor (e.g., metal turns 204, 206, 208, and 210 in Figure 2B) patterned within the dielectric (e.g., dielectric 202 in Figure 2B). *See*, e.g., page 14, line 23, page 15, line 1, and Figure 2B of the present application. The conductor (e.g., metal turns 204, 206, 208, and 210 in Figure 2B) has first and second terminals (e.g., connection terminals 212 and 214, respectively, in Figure 2A) which are respective first and second terminals of the inductor (e.g., inductor 200 in Figure 2A). *See*, e.g., page 10, lines 1-5 and Figure 2A of the present application. The conductor (e.g., metal turns 204, 206, 208, and 210 in Figure 2B) comprises a plurality of metal turns (e.g., metal turns 204, 206, 208, and 210 in Figure 2B) which are not situated underneath the dielectric (e.g., dielectric 202 in Figure 2B) and are not situated above the dielectric (e.g., dielectric 202 in Figure 2B).

In the structure, the permeability conversion material and the dielectric (e.g., dielectric 202 in Figure 2B) are not situated underneath the inductor (e.g., inductor 200 in Figure 2B) and the dielectric (e.g., dielectric 202 in Figure 2B) is not situated over the inductor (e.g., inductor 200 in Figure 2B). The dielectric (e.g., dielectric 202 in Figure 2B) and the plurality of metal turns (e.g., metal turns 204, 206, 208, and 210 in Figure

2B) of the conductor (e.g., metal turns 204, 206, 208, and 210 in Figure 2B) have a same thickness (e.g., depth 222 in Figure 2B). *See*, e.g., page 14, lines 1-2 and Figure 2B of the present application.

C. Claim 37

Independent claim 37 defines a semiconductor chip. The semiconductor chip includes a first dielectric area (e.g., dielectric 303 in Figure 3B) of a dielectric (e.g., dielectric 303 in Figure 3B) having a first permeability. The semiconductor chip further includes a second dielectric area (e.g., dielectric areas 302 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B) having a permeability conversion material interspersed therein by ion sputtering, such that a permeability of the second dielectric area (e.g., dielectric areas 302 in Figure 3B) is higher than the first permeability. *See*, e.g., page 16, lines 21-23, page 17, lines 1-2 and Figure 3B of the present application.

The semiconductor chip further includes an inductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) patterned in the second dielectric area (e.g., dielectric areas 302 in Figure 3B). The inductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) has first and second connection terminals (e.g., connection terminals 312 and 314 in Figure 3A) capable of providing connection to a device fabricated in the first dielectric area (e.g., dielectric 303 in Figure 3B) of the semiconductor chip. *See*, e.g., page 15, lines 7-10 and Figures 3A and 3B of the present application.

In the semiconductor chip, the dielectric (e.g., dielectric 303 in Figure 3B) and the permeability conversion material are not situated underneath the inductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) and the dielectric is not situated over the inductor. The first dielectric area (e.g., dielectric 303 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B) is not situated underneath the second dielectric area (e.g., dielectric areas 302 in Figure 3B) of the dielectric (e.g., dielectric 303 in Figure 3B) and is not situated over the second dielectric area of the dielectric. The first dielectric area (e.g., dielectric 303 in Figure 3B), the second dielectric area (e.g., dielectric areas 302 in Figure 3B), and the inductor (e.g., metal turns 304, 306, 308, and 310 in Figure 3B) have a same thickness (e.g., depth 222 in Figure 2B). *See*, e.g., page 14, lines 1-2 and Figure 2B of the present application.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 24, 25, 30-44, and 46-48 under 35 USC §112, first paragraph, as failing to comply with the written description requirement.

B. Claims 24, 25, 30-44, and 46-48 under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,013,939 to El-Sharawy et al. (hereinafter "El-Sharawy") in view of U.S. Patent No. 6,287,932 to Forbes et al. (hereinafter "Forbes") and "Applicant's Admitted Prior Art."

C. Claims 31-36 under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent No. JP 402262308A to Tetsuya Yokogawa (hereinafter "Yokogawa") in view of

U.S. Patent No. 6,069,397 to Cornett et al. (hereinafter "Cornett") and U.S. Patent No. 5,446,311 to Ewen et al. (hereinafter "Ewen").

ARGUMENT

A. Rejection of Claims 24, 25, 30-44, and 46-48 Under 35 U.S.C. §112, First Paragraph, as Failing to Comply With the Written Description Requirement.

The Examiner has rejected claims 24, 25, 30-44, and 46-48 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. More specifically, the Examiner states that: "[t]here is no support in the specification for the claimed limitations of said first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness, as recited in claims 24, 31 and 37." Page 2 of the Final Rejection dated April 24, 2006. For the following reasons, Appellants respectfully submit that the pending claims satisfy the written description requirement of 35 U.S.C. §112, first paragraph.

Independent claims 24 and 37 specify that the first dielectric area, the second dielectric area, and the conductor have a same thickness, and independent claim 31 specifies that the dielectric and the plurality of metal turns of the conductor have a same thickness. In the embodiment of the invention shown in Figure 2B, the thickness of dielectric 202 and the thickness of the conductor (e.g., metal segments 204, 206, 208, and 210) are shown to be equal, as indicated by depth 222. Furthermore, the present application specifically discloses by example that: "the depth of dielectric 202 and metal

segments 204, 206, 208, and 210, referred to by numeral 222, is approximately 3.0 microns." Page 14, lines 1-2 and Figure 2B of the present application.

Therefore, as disclosed in the present application, dielectric 202 and metal segments 204, 206, 208, and 210 in one embodiment have a single (i.e., equal) depth as shown by depth 222 in Figure 2B. Accordingly, the first and second dielectric areas (e.g., dielectric area 303 and dielectric areas 302, respectively) and the conductor (e.g., metal segments 304, 306, 308, and 310) shown in Figure 3B, which shows a cross sectional view of inductor 300 during a selective ion implantation step, also have a same thickness (e.g., depth 222 in Figure 2B) in one embodiment. Thus, based on the foregoing reasons, Appellants respectfully submit that claims 24, 25, 30-44, and 46-48 satisfy the requirements of 35 U.S.C. §112, first paragraph.

B. Rejection of Claims 24, 25, 30-44, and 46-48 Under 35 U.S.C. §103(a) as Being Unpatentable Over El-Sharawy in View of Forbes and "Applicant's Admitted Prior Art."

Applicants respectfully submit that the present invention, as defined by independent claims 24, 31, and 37, is patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art," either singly or in combination.

In contrast to the present invention as defined by independent claim 24, El-Sharawy does not teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where the dielectric is a low-k dielectric, a permeability conversion material

interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first and second areas of the dielectric and the conductor have a same thickness. El-Sharawy specifically discloses monolithic inductor 20 including center coil region 36, which includes insulative layer 30, magnetic material layer 32, insulative layer 34, and metal layers 28 and 40, which are situated over and under center coil region 36, respectively. *See*, e.g., Figure 1 and related text of El-Sharawy. In El-Sharawy, conductive plugs 38 extend through center coil region 36 of inductor 20 and electrically connect metal layers 28 and 40. *See*, e.g., Figure 1 and related text of El-Sharawy.

However, as clearly shown in Figure 1 of El-Sharawy, magnetic material layer 32, which includes magnetic material, has a different thickness than conductive plugs 38. Thus, El-Sharawy fails to teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where the dielectric is a low-k dielectric, a permeability conversion material interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first and second areas of the dielectric and the conductor have a same thickness, as specified by independent claim 24.

In contrast to the present invention as defined by independent claim 24, Forbes does not teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where the dielectric is a low-k dielectric, a permeability conversion material interspersed within the second area of the dielectric such that the permeability of the second area of

the dielectric is higher than the permeability of a first area of the dielectric, where the first and second areas of the dielectric and the conductor have a same thickness. Forbes specifically discloses inductor 200 coupled to device 210, where inductor 200 includes inductor pattern 230. *See*, e.g., column 4, lines 17-20 and Figure 2 of Forbes.

On page 3 of the Final Office Action dated April 24, 2006, the Examiner states that "Forbes et al. teach in Figure 2 and related text a first area of dielectric (the white area located above device 210 and surrounding inductor 210) having a first permeability, wherein said first area of said dielectric is not situated underneath a second area of said dielectric (the second area of dielectric is the area where inductor 200 is formed) and not situated over the second area of said dielectric." However, as is clearly shown in Figure 2 of Forbes, the first area of the dielectric, the second area of the dielectric, and inductor pattern 230 do not have the same thickness. Thus, Forbes fails to teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where the dielectric is a low-k dielectric, a permeability conversion material interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first and second areas of the dielectric and the conductor have a same thickness, as specified by independent claim 24. Thus, Forbes fails to cure the basic deficiencies of El-Sharawy discussed above.

On page 4 of the Final Office Action dated April 24, 2006, the Examiner has cited Figure 1 and related text of the present application to teach "a first area of dielectric 102 comprising silicon oxide and having a first permeability, surrounding the inductor."

However, Figure 1 of the present application fails to teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where the dielectric is a low-k dielectric, a permeability conversion material interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first and second areas of the dielectric and the conductor have a same thickness, as specified by independent claim 24. Thus, the combination of Forbes and Figure 1 of the present application fails to cure the basic deficiencies of El-Sharawy discussed above. Thus, Applicants respectfully submit that the combination of El-Sharawy, Forbes, and Figure 1 of the present application suggested by the Examiner does not and cannot result in the present invention as specified in independent claim 24.

For the foregoing reasons, Applicants respectfully submit that the present invention, as defined by independent claim 24, is not taught, disclosed, or suggested by El-Sharawy, Forbes, and "Applicant's Admitted Prior Art." Thus, independent claim 24 is patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art." As such, claims 25 and 30 depending from independent claim 24 are, *a fortiori*, also patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art" for at least the reasons presented above and also for additional limitations contained in each dependent claim.

In contrast to the present invention as defined by independent claim 31, El-Sharawy does not teach, disclose, or suggest an inductor comprising a conductor

patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness. As discussed above, El-Sharawy specifically discloses magnetic material layer 32, which is formed from a thin film ferromagnetic or ceramic composite magnetic material, conductive plugs 38, which extend through center coil region 36 and electrically contact conductive layer 28 situated below center coil region 36, and conductive layer 40, which is situated above center coil region 36. However, El-Sharawy fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31.

In contrast to the present invention as defined by independent claim 31, Forbes does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness. As discussed above, Forbes specifically discloses inductor 200 coupled to device 210, where inductor 200 includes inductor pattern 230.

However, Forbes fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31. Thus, Forbes fails to cure the basic deficiencies of El-Sharawy discussed above.

As discussed above, Figure 1 and related text of the present application merely discloses a first area of dielectric 102 comprising silicon oxide and surrounding an inductor. However, Figure 1 of the present application fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31.

For the foregoing reasons, Applicants respectfully submit that the present invention, as defined by independent claim 31, is not taught, disclosed, or suggested by El-Sharawy, Forbes, and "Applicant's Admitted Prior Art." Thus, independent claim 31 is patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art." As such, claims 32-36 depending from independent claim 31 are, *a fortiori*, also patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior

Art" for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Independent claim 37 includes similar limitations as independent claim 24. Also, as discussed above, Figure 1 of the present application merely discloses a first area of dielectric 102 comprising silicon oxide and surrounding an inductor. However, Figure 1 of the present application fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 37. Thus, Applicants respectfully submit that independent claim 37 is also patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art." As such, claims 38-44 and 46-48 depending from independent claim 37 are, *a fortiori*, also patentably distinguishable over El-Sharawy, Forbes, and "Applicant's Admitted Prior Art" for at least the reasons presented above and also for additional limitations contained in each dependent claim.

C. Rejection of Claims 31-36 Under 35 U.S.C. §103(a) as Being Unpatentable Over Yokogawa in View of Cornett and Ewen.

Applicants respectfully submit that the present invention, as defined by independent claim 31, is patentably distinguishable over Yokogawa, Cornett, and Ewen, either singly or in combination.

In contrast to the present invention as defined by independent claim 31, Yokogawa does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness. Yokogawa specifically discloses inductor 2, which includes spiral type coil 3 sandwiched between insulating layers 4. See, for example, the constitution and Figures 1 and 2 of Yokogawa. On page 7 of the Final Office Action dated April 24, 2006, the Examiner designates a first area of dielectric 4 to be located above the white dielectric layer in the center of the structure and a second area of dielectric to be the white dielectric area located in between inductor 3 and having a second permeability.

However, as clearly shown in Figure 2 of Yokogawa, dielectric 4 and spiral type coil 3 have different thicknesses. Thus, Yokogawa fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the

dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31.

In contrast to the present invention as defined by independent claim 31, Cornett does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness. Cornett specifically discloses inductor layer 220 including patterned conductive trace 110, which is embedded within magnetic material layers 221 and 223. See, for example, column 2, lines 18-21 and Figure 2 of Cornett. However, Cornett fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31. Thus, Cornett fails to cure the basic deficiencies of Yokogawa as discussed above.

In contrast to the present invention as defined by independent claim 31, Ewen does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality

of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness. Ewen is cited by the Examiner to teach a passivation/dielectric layer comprising silicon oxide. However, Ewen fails to teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the dielectric and the plurality of metal turns of the conductor have a same thickness, as specified in independent claim 31. Thus, Ewen combined with Cornett fails to overcome the deficiencies of Yokogawa as discussed above.

For the foregoing reasons, Applicants respectfully submit that the present invention as defined by independent claim 31 is not suggested, disclosed, or taught by Yokogawa, Cornett, and Ewen, either singly, or in any combination thereof. Thus, independent claim 31 is patentably distinguishable over Yokogawa, Cornett, and Ewen. As such, claims 32-36 depending from independent claim 31 are, *a fortiori*, also patentably distinguishable over Yokogawa, Cornett, and Ewen for at least the reasons presented above and also for additional limitations contained in each dependent claim.

CONCLUSION

Based on the foregoing reasons, the present invention, as defined by independent claims 24, 31, and 37, and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 24, 25, 30-44, and 46-48 pending in the

present application are patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, an early allowance of claims 24, 25, 30-44, and 46-48 pending in the present application is respectfully requested.

This Appeal Brief is submitted herewith with an Appendix of the appealed claims and the requisite fee for filing the Appeal Brief.

Respectfully Submitted,
FARJAMI & FARJAMI LLP

Date: 9/11/06

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Christina Carter 9/11/06
Signature Date

APPENDIX OF CLAIMS ON APPEAL

Claim 24: A structure in a semiconductor chip, said structure comprising:

a first area of a dielectric, said first area of said dielectric having a first permeability;

a second area of said dielectric, said second area of said dielectric having a second permeability, said second permeability being higher than said first permeability;

a permeability conversion material interspersed within said second area of said dielectric, said permeability conversion material having a third permeability, said third permeability being greater than said first and said second permeabilities;

a conductor patterned in said second area of said dielectric, said permeability conversion material not being situated underneath said conductor;

wherein said dielectric is not situated underneath said conductor and not situated over said conductor, wherein said first area of said dielectric is not situated underneath said second area of said dielectric and not situated over said second area of said dielectric, wherein said dielectric is a low-k dielectric, wherein said permeability conversion material is selected from the group consisting of nickel, iron, nickel-iron alloy, and magnetic oxide, wherein said conductor is selected from the group consisting of copper, aluminum, and copper-aluminum alloy, and wherein said permeability conversion material is interspersed in said second area of said dielectric by ion implantation, wherein

said first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness.

Claim 25: The structure of claim 24 wherein said dielectric is silicon dioxide.

Claim 30: The structure of claim 24 wherein said conductor is patterned as a square spiral.

Claim 31: A structure in a semiconductor chip, said structure comprising:

a dielectric having a first permeability;

a permeability conversion material having a second permeability, said permeability conversion material being interspersed within said dielectric, wherein said second permeability is greater than said first permeability;

an inductor comprising a conductor patterned within said dielectric, said conductor having first and second terminals, said first and second terminals of said conductor being respectively first and second terminals of said inductor, said permeability conversion material not being situated underneath said inductor, said dielectric not being situated underneath and not being situated over said inductor;

wherein said permeability conversion material comprises metal ions, wherein said conductor comprises a plurality of metal turns, wherein said plurality of metal turns are

not situated underneath said dielectric and not situated above said dielectric, wherein said dielectric and said plurality of metal turns of said conductor have a same thickness.

Claim 32: The structure of claim 31 wherein said dielectric is silicon dioxide.

Claim 33: The structure of claim 31 wherein said dielectric is a low-k dielectric.

Claim 34: The structure of claim 31 wherein said permeability conversion material is selected from the group consisting of nickel, iron, nickel-iron alloy, and magnetic oxide.

Claim 35: The structure of claim 31 wherein said conductor is selected from the group consisting of copper, aluminum, and copper-aluminum alloy.

Claim 36: The structure of claim 31 wherein said conductor is patterned as a square spiral.

Claim 37: A semiconductor chip comprising:

a first dielectric area of a dielectric having a first permeability;

a second dielectric area of said dielectric having a permeability conversion material interspersed therein such that a permeability of said second dielectric area is higher than said first permeability;

an inductor patterned in said second dielectric area, said inductor having first and second connection terminals, said first and second connection terminals being capable of providing connection to a device fabricated in said first dielectric area of said semiconductor chip, said permeability conversion material not being situated underneath said inductor;

wherein said dielectric is not situated underneath said inductor and not situated over said inductor, wherein said first dielectric area of said dielectric is not situated underneath said second dielectric area of said dielectric and not situated over said second dielectric area of said dielectric, wherein said permeability conversion material is interspersed in said second dielectric area of said dielectric by ion sputtering, wherein said first dielectric area, said second dielectric area, and said inductor have a same thickness.

Claim 38: The semiconductor chip of claim 37 wherein said permeability conversion material is interspersed in said second dielectric area when said first dielectric area is covered with photoresist.

Claim 39: The semiconductor chip of claim 37 wherein said first dielectric area comprises silicon dioxide.

Claim 40: The semiconductor chip claim 37 wherein said first dielectric area comprises a low-k dielectric.

Claim 41: The semiconductor chip of claim 37 wherein said second dielectric area comprises silicon dioxide.

Claim 42: The semiconductor chip of claim 37 wherein said second dielectric area comprises a low-k dielectric.

Claim 43: The semiconductor chip of claim 37 wherein said permeability conversion material is selected from the group consisting of nickel, iron, nickel-iron alloy, and magnetic oxide.

Claim 44: The semiconductor chip of claim 37 wherein said permeability conversion material is interspersed in said second dielectric area by ion implantation.

Claim 46: The semiconductor chip of claim 37 wherein said inductor comprises material selected from the group consisting of copper, aluminum, and copper-aluminum alloy.

Claim 47: The semiconductor chip of claim 37 wherein said inductor is patterned as a square spiral.

Claim 48: The semiconductor chip of claim 46 wherein said permeability conversion material is selected from the group consisting of nickel, iron, nickel-iron alloy, and magnetic oxide.

EVIDENCE APPENDIX

(NONE)

RELATED PROCEEDINGS APPENDIX

(NONE)